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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,096	01/20/2004	Yoshihiro Shona	OKI.635	6947

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EXAMINER	
ROJAS, MIDYS	
ART UNIT	**PAPER NUMBER**
2185	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/30/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/759,096	SHONA, YOSHIHIRO	
	Examiner	Art Unit	
	Midys Rojas	2185	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 October 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, filed on 10/24/06, have been fully considered but they are not persuasive.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., flash memories) are not recited in the rejected claim(s).

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., first determining a vacant area) are not recited in the rejected claim(s).

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., rewriting does not occur if there is data already in the corresponding area) are not recited in the rejected claim(s).

Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant argues that the Noya reference does not teach using the XOR function to rewrite data in the memory. However, as admitted by applicant (page 11, paragraph 2), the Noya reference performs an XOR operation to identify the changing block and overwrite the new data in that block. This operation is equivalent to using the XOR function to rewrite data since in overwriting the data the data is being rewritten.

Applicant also argues that in the present application, rewriting does not occur if there is data already in the corresponding area. This is contradictive to the claim language, which states a method of writing rewrite data **over existing data**.

Applicant argues that the XOR operation of the Noya reference is not used to obtain the rewrite data. However, since the XOR operation indicates if the new data represents a change, it identifies the new data as rewrite data, thus allowing the system to obtain the new data and rewrite it.

Applicant argues that Noya does not teach existing data being written at a same position in the respective areas. However, Noya discloses writing the new data in the same position of the old data (Col. 2, line 55 to Col. 3, line 6).

Applicant argues that the Noya reference does not teach retaining the previous XOR data and using this retained data and data in another area to undergo another XOR process. However, Claim 1 does not disclose retaining the previous XOR data. Noya does teach using the first result of the XOR operation to undergo another XOR operation with the parity block, wherein the parity block is data in another area.

Applicant argues that the Noya reference does not teach performing a similar exclusive-OR process up to a final area because in claim 1, the previous XOR result and the data in the next area undergo the XOR process. However, claim 1 states that the previous XOR result and the data in another area (not next area) undergo the XOR process. Additionally, claim 1 states "performing a similar exclusive-OR process up to a final area" but does not claim details regarding the similar exclusive or process.

Applicant argues that the Noya reference does not teach using an area number. However, the ultimate data numbers are representative of pointer values and the existing data are read from the area of the sector based on the pointer values indicated in the write commands. The ultimate area number is representative of the current pointer pointing at the block of the current write. Therefore, once the write is complete, the system determines if the area number is smaller than a number of the areas of the sector, thus indicating that it is not the last block in the memory, and the area number is incremented by 1 and the new rewrite data is written to the area of the incremented area number, wherein this represents the process of obtaining the write request for the next block. When the area number is equal to the number of the areas, indicating that it is the last block in memory, all data within the sector are erased, the new rewrite data is written to the first area of the sector and the area number is set to 1. In this system, erasure is achieved by writing over the old data, therefore, upon writing into the entire memory, the write requests will restart to the beginning of the memory and therefore, the memory blocks will be once again rewritten.

Applicant argues that it is not understood how the Noya reference discloses that when data at the target position in an area is an initial value, then the most recent exclusive-OR data is written to the target position of that area. However, the target position in an area being of an initial value represents the instance in which the target memory block is not empty and the most recent exclusive-OR data is written to the target position of that area is represented by the data difference being overwritten as the new parity (Col. 3, lines 1-6).

Applicant argues that the Noya reference does not teach selecting one of the two memories based on memory selection data. However, Noya disclose two memories that can be

accessed in a write (Figure 1) therefore, the selector data being used to select between the memories and sectors is represented by the write request from the host which prompts the writing of the new data and the original data to be written to cache and therefore selects the location of the old data, which in turn selects the sector in question, Col. 4, lines 40-67 and Col. 2, lines 55-67).

Applicant argues that the Noya reference does not teach writing rewrite data to an area determined by the area designation data in the control area of the selected memory. However, Noya discloses writing rewrite data in the block of the previous data which is designated by the information in the write request which is interpreted by the system via the computer system processor 100 ("...if the data difference is non-zero... the new block is written over the old block in the disk array... and the data difference is overwritten as the new parity", Col. 3, lines 1-6, see Figure 1). In this system, the area determined is the block of data where the rewrite data is to be written, the designation data is the location designated by the write request.

Applicant argues that the Noya reference does not teach erasing data in the areas of another memory in a piecemeal manner. However, the Noya reference teaches discarding the new data block and associated parity from the cache (Col. 5, lines 45-64) wherein the cache is the other memory. Since the limitation of a "piecemeal manner" is only described as a stepwise manner, all discarding of information must be in a piecemeal manner since steps must be taken by the computer system in order to complete the erasure of data.

Applicant argues that the Noya reference does not teach switching the roles of two memories and repeating the steps so that the rewrite data are written to the two memories.

However, the switching of the memories is controlled by the instruction to write a certain data block, which may indicate that the new data block must be written in the other memory.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Noya (6,513,142).

Regarding Claim 1, Noya discloses a method of writing rewrite data over existing data in a memory (Col. 3, lines 1-6, "new block is written over the old block in the disk array"), the memory having a sector partitioned into a plurality of areas (online disk 116 or 117, Figure 1), the existing data being written at a same position in the respective areas (original block of data is stored within disk, Col. 2, lines 55-67), the method comprising: taking an exclusive-OR of the rewrite data and existing data at a target position in a first area ("The cached original and new blocks of data are combined using the XOR function to derive a first result..."); taking an exclusive-OR of the exclusive-OR data, which is obtained by the previous exclusive-OR process, and existing data at the target position in a second area ("The first result is then combined by the XOR function with the original distributed parity block to derive a data difference..."); and performing a similar exclusive-OR process up to a final area (since the original and new data may comprise more than one block of data, the XOR operation must be performed for each block

of data), wherein in the course of repeating these exclusive OR processes, when the data at the target position in the area concerned are an initial value, then the most recent exclusive-OR data are written to the target position in the area concerned ("...if the data difference is non-zero... the new block is written over the old block in the disk array... and the data difference is overwritten as the new parity", Col. 3, lines 1-6).

Regarding Claim 2, Noya discloses a method of writing rewrite data over existing data wherein if there is no initial value when the exclusive-OR process is carried out up to the final area (instance where the original data is zero, or the locations are empty), then for a same position in each of the areas, an exclusive-OR of data in the first area and data in the second area is taken (XOR of the original data that has been cached and the new data that has been cached, "The cached original and new blocks of data are combined using the XOR function to derive a first result...", Col. 2, lines 55-67) , an exclusive-OR of the resulting exclusive-OR data and data in a third area is taken ("The first result is then combined by the XOR function with the original distributed parity block to derive a data difference..."), and a similar exclusive-OR process is performed up to the final area (since the original and new data may comprise more than one block of data, the XOR operation must be performed for each block of data) so that all data within the sector are read ("the original block of data is read from the disk and also cached...") and the data at the target positions are changed to the rewrite data ("...if the data difference is non-zero... the new block is written over the old block in the disk array... and the data difference is overwritten as the new parity", Col. 3, lines 1-6. Since the initial values are zero [non initial values], then the data difference will be non-zero), and then, all the data within the sector are erased and all new data, including the rewrite data, are written to the first area in the

sector (in writing the new data in to the target memory, the previously stored data is erased from the memory and replaced with the new data).

Claim 3 is rejected using the same rationale as that of Claim 1.

Claim 4 is rejected using the same rationale as that of Claim 2.

Claim 5 is rejected using the same rationale as that of Claim 1 wherein the pointer sector is represented by container configurations tables in the container layer 120 which allow the system to partition the disk drives and refer to the partitions when accessing (Col. 4, lines 1-8). Therefore, in accessing specific areas in memory, such as the original data, the cached new data, and the parity data, these are referred to as first, second, and third pointer data. Since ultimate data numbers are representative of pointer values, the existing data are read from the area of the sector based on the pointer values. The ultimate area number is representative of the current pointer pointing at the block of the current write. Therefore, once the write is complete, the system determines if the area number is smaller than a number of the areas of the sector, thus indicating that it is not the last block in the memory, and the area number is incremented by 1 and the new rewrite data is written to the area of the incremented area number, wherein this represents the process of obtaining the write request for the next block. When the area number is equal to the number of the areas, indicating that it is the last block in memory, all data within the sector are erased, the new rewrite data is written to the first area of the sector and the area number is set to 1. In this system, erasure is achieved by writing over the old data; therefore, upon writing into the entire memory, the write requests will restart to the beginning of the memory and therefore, the memory blocks will be once again rewritten.

Claim 6, is rejected using the same rationale as that of Claim 1 and 2.

Claim 7 is rejected using the same rationale as that of Claim 1 wherein the selector sector is the cache memory 250 and the selector data being used to select between the sectors is represented by the write request from the host which prompts the writing of the new data and the original data to be written to cache and therefore selects the location of the old data, which in turn selects the sector in question (Col. 4, lines 40-67 and Col. 2, lines 55-67). When data at the target position in an area is an initial value (the block of data is not empty), then the most recent exclusive-OR data is written to the target position of that area (the data difference is overwritten as the new parity, Col. 3, lines 1-6).

Claim 8 is rejected using the same rationale as that of Claim 2 wherein the sector selection data is incremented by one in representation of obtaining the next write request from the host.

Claim 9 is rejected using the same rationale as that of Claim 1 wherein incrementing the sector selection data, the system is obtaining and starting to process the next write request from the host, and so, the steps of Claim 1 must be repeated for this new write request.

Regarding Claim 10, Noya discloses a method of rewriting data in two memories (116, 117), each of the two memories having a sector (partitions), the sector having a plurality of areas to which data are written and a control area to which memory selection data and area designation data are written (configurations tables 120, Col. 4, lines 1-8), the method comprising:

A) selecting one of the two memories based on memory selection data in the control areas of the two memories (selector data being used to select between the memories and sectors is represented by the write request from the host which prompts the writing of the new data and

the original data to be written to cache and therefore selects the location of the old data, which in turn selects the sector in question, Col. 4, lines 40-67 and Col. 2, lines 55-67);

B) writing rewrite data to an area determined by the area designation data in the control area of the selected memory ("...if the data difference is non-zero... the new block is written over the old block in the disk array... and the data difference is overwritten as the new parity", Col. 3, lines 1-6);

C) erasing data in the areas of the other memory in a piecemeal manner ("new data block and associated parity.. are discarded from the cache", Col. 5, lines 45-64);

D) repeating the steps B and C until the rewrite data are written to all the areas of the selected memory, such that erasing of the data within all the areas of the other memory is completed when the rewrite data are written to all the areas of the selected memory (since the original and new data may comprise more than one block of data, the rewriting operation must be performed for each block of data); and

E) switching the roles of the two memories and repeating the steps B, C and D so that the rewrite data are written to the two memories (wherein the switching of the memories is controlled by the instruction to write a certain data block, which may indicate that the new data block must be written in the other memory).

Regarding Claim 11, Noya discloses the method of rewriting data in two memories, wherein a cache memory 250 is provided in addition to the two memories, so that when the rewrite data is written to one of the two memories, the same rewrite data are also written to the cache memory, and wherein when the rewritten data should be read from that memory, the rewrite data are read from the cache memory, not from that memory (Col. 2, lines 55-67).

Claim 12 is rejected using the same rationale as that of Claim 5.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Midys Rojas whose telephone number is (571) 272-4207. The examiner can normally be reached on M-F 5:30am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sanjiv Shah can be reached on (571) 272-4098. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

January 22, 2007

Midys Rojas
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